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# FINAL & CONSOLIDATED REPORT (*) ON THE INCURSION, EVOLUTION & ERADICATION OF FMD IN GREECE ( Summer 2000 )

## 1. INTRODUCTION

Foot-and-Mouth disease (FMD) – type $O_1$ – occurred for the last time in Greece in the Prefecture of Evros in September 1996.
The disease was eradicated by applying a stamping out / non vaccination policy and Greece regained by OIE the status of "*FMD free country without vaccination*" in May 1998 and held it until July 2000, when it was suspended due to a new incursion of type Asia 1.

FMDV type Asia 1 was last recorded in Greece in 1961 – again in Evros – and it was then dealt with by partial slaughter and vaccination.

On the other hand, FMDV type Asia 1 is steadily reported, along with other types, in Turkey where it gradually progressed westwards from Eastern Anatolia near the Iranian border, in 1999, to the city of Bolu in the Western Buffer Zone, in June 2000.

This was the official information available to the Greek Authorities in early July 2000, when incursions of FMDV type Asia 1 were recorded along Evros river on the Greek-Turkish border.The main events relating to the incursion,evolution and eradication of FMD in Greece in summer 2000 are described in this report.

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## 2. INCURSION OF FMD

Primary incursion of FMD was suspected on 10 July, and confirmed on 11 July, in two beef cattle herds grazing freely in the South-Eastern part of the Evros Delta on the Greek -Turkish border (Map 1).
Judging by the age of lesions and the mean incubation period,the estimated date of primary infection is placed on 2nd July ± 1 day.

Due to the animal husbandry conditions and practices in the Delta area, by the time of detection the disease had become widespread inside the Delta and escaped to the contiguous town of Ferres.

The FMDV strain isolated in Greece was genetically fingerprinted in WRL, Pirbright, and found to be identical to the FMDV type Asia 1 strain isolated in Turkey in 1999 and 2000 (Dendrogram 1). This settles the origin of the disease.

## 3. EVOLUTION OF FMD

### 3.1 Description of outbreaks

A recapitulative list of outbreaks,broken down by ***geographical*** and ***epidemiological cluster***, is given in Table 1 below and locations of outbreaks are indicated in Map 2 attached to this report.

| Outbreak No.& Type | Location | Animals Present | | | Suspicion | | Confirmation | |
|---|---|---|---|---|---|---|---|---|
| | | Species | Number | Sick | Date | Reason | Date | Reason |
| 00/01-**Primary** | Evros Delta, EVROS | Bovines | 138 | 12 | 11.07 | clinical | 11.07 | VD |
| 00/02-Second. | | Bovines | 55 | 5 | 10.07 | clinical | 11.07 | VD |
| 00/03-Second. | | Bovines | 305 | 6 | 18.07 | clinical | 18.07 | clinical |
| 00/06-Second. | | Bovines | 129 | 5 | 27.07 | clinical | 31.07 | VD |
| 00/10-Second. | | Bovines | 46 | 5 | 07.08 | clinical | 10.08 | serol/VD |
| 00/04-Second. | Ferres, EVROS | Bovines | 160 | 0 | 17.07 | contact | 20.07 | serology |
| 00/07-Second. | | Sheep | 642 | 15 | 27.07 | clinical | 01.08 | serol/VD |
| 00/08-Second | | Bovines | 111 | 10 | 01.08 | clinical | 03.08 | serol/VD |
| 00/05-**Primary** | Peplos, EVROS | Bovines | 89 | 10 | 19.07 | clinical | 24.07 | serology |
| 00/09-Second. | Potamia, XANTHI | Bovines | 122 | 60% | 07.08 | clinical | 08.08<br>09.08 | serology<br>VD |
| 00/11-**Primary** | Mandra, EVROS | Bovines | 58 | 8 | 17.08 | clinical | 18.08 | VD |
| 00/13-Second. | Asimenio | Bovines | 209 | 15 | 07.09 | clinical | 11.09 | VD |
| 00/14-Second. | Didim/cho | Bovines | 228 | 11 | 10.09 | clinical | 14.09 | VD |
| 00/12-Second. | Selino, XANTHI | Bovines | 72 | 3 | 19.08 | clinical | 24.08 | VD |

Table 1: Recapitulative table of FMD outbreaks in Evros and Xanthi, Greece, 2000
* **NOTE** : Serial Numbers of outbreaks indicate chronological order of detection and reporting

In total, approximately 5.400 bovines, 2.300 sheep/goats and 300 pigs were killed and destroyed either in the outbreaks or in contact holdings.

## 3.2 Epidemiological considerations

Epidemiological relations between outbreaks, explaining the source of infection and the means of transmission, are summarised in Table 2 and schematically presented in the Flow Chart attached to this report.

| Serial No. of Outbreak | Type of Outbreak | Source of Infection | Means of Transmission | Estimated Date of Infection |
|---|---|---|---|---|
| 00/01 | **Primary** | Turkey | Animals from Turkey crossing Evros river | 02.07 ± 1 day |
| 00/02 | Secondary | 00/01 (?) | Common grazing | 05.07 ± 2 days |
| 00/03 | Secondary | 00/02 | Common grazing | 08.07 ± 2 days |
| 00/06 | Secondary | 00/03 | Common grazing | 20.07 ± 2 days |
| 00/10 | Secondary | 00/06 | Contiguity | 30.07 ± 2 days |
| 00/04 | Secondary | 00/01 | Common grazing | 07.07 ± 2 days |
| 00/07 | Secondary | 00/04 | Indirect contact | 16.07 ± 2 days |
| 00/08 | Secondary | 00/04 | Contiguity | 17.07 ± 2 days |
| 00/05 | **Primary** | Turkey | Direct contact with infected animals (access by land ) | 10.07 ± 2 days |
| 00/09 | Secondary | 00/07 | Indirect contact (person + fomites) | 25.07 |
| 00/11 | **Primary** | Turkey | Animals from Turkey crossing Evros river | 27.07 |
| 00/13 | Secondary | 00/11 | Vehicle / Persons | 28.08 |
| 00/14 | Secondary | 00/11 | Vehicle / Persons | 29.08 |
| 00/12 | Secondary | 00/09 | Indirect contact (person + fomites) | 06.08 ± 2 days |

Table 2 : Epidemiological relations of FMD outbreaks, Greece, 2000

***Comments***

- According to the assessment of the Greek Authorities, there were three (3) primary incursions of FMD at a 60-km front along Evros river.
  In all cases the working hypothesis for transmission was direct or indirect contact of animals across the border. This hypothesis, however, would assume presence of active infection at the eastern side of the border and close to the outbreaks. Otherwise, a new risk assessment is required to explain long-range transmission and re-orient the objectives and means of surveillance.
- With the notable exception of the Evros Delta, in 3 out of 6 clusters there was only a single outbreak without any "fallout".
- In the Evros Delta, the animal husbandry conditions and practices made selective forwards tracing practically impossible due to multiple contacts in common grazing and watering. Consequently, the Delta was considered and treated as a single epi-demiological unit. Nevertheless, more that 700 cattle were salvaged in the Delta.
- Spreading of FMD to Xanthi was due to the "human factor", acting through criminal negligence or premeditated action. However, the means and the circumstances of transmission were recognized promptly and dealt with efficiently.

## 4. ERADICATION OF FMD

Eradication of FMD was achieved by applying a stamping out / non vaccination policy and proved by a serological investigation designed and executed as described below.

### 4.1 Objective

To detect and destroy all seropositive animals around known sources of FMDV, so as :

- ✓ To eliminate any risk of residual infection from carrier animals, and
- ✓ To preclude any interference with future serological monitoring and screening schemes.

Successful completion of the scheme signifies eradication of FMD and leads to lifting of all restrictions and restocking of depopulated premises.

### 4.2 Modalities

In the absence of any legal provisions or technical guidelines for sero-surveillance,the following scheme was proposed by the Greek Authorities :

*a)* In ***Protection Zones*** *:*

- o Uniform geographical distribution of samples (100 % of villages)
- o No among-flock discrimination (100 % of flocks)
- o Random within-flock sampling (10 % of animals present, min.15 samples /flock)

***NOTE : This scheme more than satisfies the statistical criterion for detecting 5% prevalence with 95% level of confidence.**

b) In ***Surveillance Zones*** :

- o Uniform geographical distribution of samples (100 % of villages)
- o Random among-flock selection (20 % of flocks in every village)
- o Random within-flock sampling (10 % of animals present, min.15 animals / flock)

In all cases serological investigation commenced after 21 days had elapsed since the last recorded outbreak in the respective area.

In case of inconclusive results, the individual animals were re-sampled after 14 days.
In case of positive results, all animals present in the flock were be sampled.
No serological screening in bovines and pigs was envisaged.
All sampled animals were individually identified by ear tags.

### 4.3 Estimated number of samples

On the basis of the scheme outlined above, the number and distribution of samples estimated to be tested in the framework of serological surveillance is given in Table 3.
A total of **4.154** samples was forecasted,plus possible re-tests or complete samplings.

| Outbreak No | Location (Clusters) | Protection Zones | | Surveillance zones | |
|---|---|---|---|---|---|
| | | Animals Present | No of samples | Animals Present | No of samples |
| 00/01 | Evros Delta | 1.265 | 126 | 700 | 70 |
| 00/02 | | | | | |
| 00/03 | | | | | |
| 00/06 | | | | | |
| 00/10 | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 00/04<br>00/07<br>00/08 | Ferres | 6.966 | 696 | 13.846 | 277 |
| 00/05 | Peplos | 4.704 | 470 | 10.167 | 203 |
| 00/09 | Potamia (Xanthi) | 3.394 | 339 | 18.520 | 370 |
| 00/11 | Mandra (Evros) | 963 | 96 | 10.542 | 210 |
| 00/13 | Asimenio | 3.776 | 377 | 6.538 | 130 |
| 00/14 | Didimotycho | 1.446 | 144 | 13.435 | 286 |
| 00/12 | Selino (Xanthi) | 1.673 | 167 | 10.550 | 211 |
| **Total** | | 24.187 | **2.415** | 84.298 | **1.739** |

Table 3 : Number and distribution of samples for serological investigation of FMD

## 4.4 Final results of serological investigation

Final and conclusive results of serological investigation carried out in September and October 2000 in the protection and surveillance zones around outbreaks of FMD are presented in Table 4 .

| **Serial No. & Location of Outbreak** | **Serological** | **Surveillance** |
|---|---|---|
| | **Forecasted Samples** | **Tested Samples (total/positive)** |
| 00/09 – Potamia, Xanthi | 339pz + 370sz = 709 | 749 / 0 = completed (*) |
| 00/12 – Selino, Xanthi | 167pz + 211sz = 378 | 382 / 0 = completed |
| Surveillance Zone of 00/09 And 00/12 inside Rodopi | | 280 / 0 = completed |
| 00/01 – Evros Delta | 126pz + 70sz = 196 | 210 / 0 = completed |
| 00/04 – Ferres, Evros | 696pz + 277sz = 973 | 975 / 0 = completed |
| 00/05 – Peplos, Evros | 470pz + 203sz = 673 | 680 / 0 = completed |
| 00/11 – Mandra, Evros | 96pz + 210sz = 306 | 310 / 0 = completed |
| 00/13 – Asimenio, Evros | 377pz + 130sz = 507 | 521 / 0 = completed (*) |
| 00/14 – Didim/cho, Evros | 144pz + 268sz = 412 | 440 / 0 = completed (*) |
| **TOTAL** | **4.154** | **4.547 / 0** |

Table 4 : Final results of serological investigation for FMD, Greece, 2000

**(*) Re-sampling of individual animals due to inconclusive results of 1st tests**

During the same period (September – October 2000) all bovine herds situated inside the protection and surveillance zones were clinically inspected for old lesions of FMD with negative results.

On the basis clinical inspections and serological results presented in Table 4 :

- Eradication of FMD in **Evros** and **Xanthi** has been achieved and documented.
- Prevention of spreading of FMD in **Rodopi**, throughout the epizootic, has also been documented.

**Claims of freedom of FMD in Greece are endorsed by the European Union and, accordingly, the Standing Veterinary Committee has voted unanimously in favor of the following Decisions :**

- **At the meeting of 07 OCT 2000, Com. Decision 2000/643 amending Com. Decision 2000/486 and lifting all restrictions due to FMD from XANTHI and RODOPI.**
- **At the meeting of 07 NOV 2000, Com. Decision 2000/... repealing Com. Decision 2000/486 and lifting all restrictions due to FMD from the entire Greek territory.**

## 5. RELATED ACTIONS & INITIATIVES

In the light of experience gained during combating FMD, the following relevant actions have been undertaken by the Greek Authorities :

### *a) Judicial & Administrative actions*

- The principle of co-liability has been introduced and judicial procedures have been activated as a supplement to, or a result of, epidemiological investigations where there are qualified suspicions of negligence or premeditated felonious acts.

### *b) Financial actions*

- Supporting documentation for payment of compensation has been extended to include detailed and purpose-designed attestations of epidemiological valuation and systematic financial controls.
- Financial sanctions to beneficiaries have been introduced, in proportion to their established co-liability in spreading disease.
- The entire legal framework of compensation procedures and conditions is being reviewed and suitable amendments are being planned for the year 2001.

### *c) Technical actions*

- The National Contingency Plan for combating FMD and other exotic diseases has been reviewed and supplemented so as to enhance efficiency in the field and co-ordination at all levels.
  The new CP is now completed and it will enter into force by the end of the year.
- The Athens Institute of FMD has been re-enforced in terms of staff and new laboratory techniques have been introduced (cell culture, ABC Elisa) so as to increase the speed and reliability of diagnostic capability.
- A new risk assessment study is being carried out and epidemio-surveillance in areas-at-risk will be reviewed in the light of its conclusions.
- A multi - disciplinary Seminar was organized, in Alexandroupolis, Evros, on 10 November 2000,addressed to various Services involved in combating exotic diseases and aiming to promote the new CP and present the conclusions of the latest risk assessment study.

*** NOTE : Complete and current documentation referring to the incursion, evolution and eradication of FMD in Greece in summer 2000 can be found at the web site of the Dept.of Infectious Diseases at http://www.minagric.gr/greek/2.3.1.html**